Technical Report 1017

Tacit Knowledge in Military Leadership: A Review of the Literature

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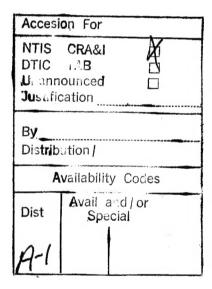**of the Deputy Chief of Staff for Personnel**

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Director

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13. ABSTRACT (Maximum 200 words)

This report reviews the theory of tacit knowledge and its theoretical and empirical background. The authors propose a three-category structure for the tacit knowledge in military leadership: intrapersonal, interpersonal, and organizational. That structure was derived from instances of leadership tacit knowledge inferred from a review of military trade journals, military "lessons learned" publications, and military memoirs. The report presents instances for the three categories. The proposed structure and representing instances are discussed in terms of (1) tacit knowledge in civilian business management; (2) U.S. Army leadership doctrine; (3) applicability across organizational levels of the U.S. Army (battalion, company, and platoon); and (4) the likelihood of further elaboration and replication of the proposed structure with application of other data collection methods.

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A primary mission of U.S. Army Research Institute for the
Behavioral and Social Sciences (ARI) is to enhance military
readiness through programmatic research that supports the effec-
tive performance of Army leaders. To accomplish this, ARI and
the United States Military Academy (USMA) established the Center
for Leadership and Organizations (CLOR) at USMA to conduct
research on priorities in the areas of organizational leadership
and leader development, education, and training. The research
described in this report is part of the ARI advanced development
research program formulated and undertaken by the CLOR and its
ARI Field Unit.

This report is the first product of a project jointly under-
taken by researchers at USMA and at Yale University. The overall
objective of the project is to test the applicability of a theory
of tacit knowledge to military leadership. Previous research has
shown that tacit knowledge, acquired through practical on-the-job
experiences, is related to executive and managerial effectiveness
in civilian organizations.

This report presents the theory of tacit knowledge and the
instances of leadership tacit knowledge found through review of
military literature. The report also sets forth a preliminary
description of the structure of the tacit knowledge in military
leadership. Ongoing research seeks to verify and elaborate on
the proposed structure. The results of that research will be
used to develop and validate tests of tacit knowledge for dif-
ferentiating Army leaders who vary in effectiveness or in level
of leadership. If successful, the research will have practical
implications for leader development. In particular, findings
will identify and provide means for measuring knowledges acquired
through the types of operational assignments and experiences the
Army uses as part of its system for leader development.

EDGAR M. JOHNSON
Director

TACIT KNOWLEDGE IN MILITARY LEADERSHIP: A REVIEW OF THE
LITERATURE

<u>EXECUTIVE SUMMARY</u>

Requirement:

To support the identification, assessment, and teaching of
tacit knowledge for military leadership by (1) presenting the
theory of tacit knowledge and reviewing empirical support for the
theory, (2) defining the domain to which the tacit knowledge
approach will be applied (organizational leadership in military
settings), and (3) identifying substantive tacit knowledge for
military leadership through a review of civilian and military
literatures on leadership.

Procedure:

The theory of tacit knowledge is presented in detail, and
the theoretical and empirical background of the theory is
reviewed. Military leadership is operationally defined, and a
position is taken on the relationship between management and
leadership. Methodological issues related to the identification
of tacit knowledge for military leadership are discussed, and a
tentative category structure for tacit knowledge for military
leadership is proposed. Instances of tacit knowledge for mili-
tary leadership, drawn from the military-leadership literature,
are presented for each of three categories: intrapersonal,
interpersonal and organizational tacit knowledge. Obtained tacit
knowledge is discussed in terms of (1) its business managers, (2)
its relation to U.S. Army leadership doctrine, and (3) its appli-
cability across three organizational levels: battalion, company,
and platoon.

Findings:

The civilian and military literatures on leadership were not
productive sources of substantive tacit knowledge for military
leadership. Some substantive tacit knowledge was obtained from
military trade journals, "lessons learned" publications, and
military memoirs. When compared with tacit knowledge for civil-
ian managers, the tacit knowledge obtained for military leaders
placed less emphasis on self-management, learning from others,
and envisioning the future. The tacit knowledge obtained for
military leadership appeared to supplement and guide the applica-
tion of leadership knowledge contained in Army doctrine.

With the exception of tacit knowledge for solving organizational problems, the tacit knowledge for military leadership appeared to apply across organizational levels. In all cases, conclusions must remain tentative because of the limitations of the leadership literature as a source of substantive tacit knowledge.

Utilization of Findings:

Theory statements and discussion of methodological issues provide a written foundation for future empirical work directed toward the identification, assessment, and teaching of tacit knowledge for military leadership. Such a foundation will enable interested parties to evaluate the application of the tacit-knowledge approach to military leadership. Preliminary evidence regarding the structure and content of tacit knowledge for military leadership, its relation to doctrine, and its applicability across levels provide focused questions that will guide future tacit-knowledge acquisition based on interviews and behavioral observations.

TACIT KNOWLEDGE IN MILITARY LEADERSHIP: A REVIEW OF THE
LITERATURE

CONTENTS

LIST OF TABLES

TACIT KNOWLEDGE IN MILITARY LEADERSHIP: A REVIEW OF THE
LITERATURE

Introduction

Members of our research team interviewed a promising young
leader this month. The young man in question was an Army
lieutenant and a platoon leader in combat support. Well spoken
and reflective, the lieutenant had clearly done a lot of thinking
about leadership. Indeed, his conversation was peppered with
terminology from his Army training and from management courses he
had taken in college. He described his leadership style as based
on mutual trust with his soldiers, on looking out for their best
interests, and on not taking himself too seriously. These basic
ideas (i.e., establishing trust, taking care of soldiers, and
practicing personal humility) are all emphasized in Army
leadership training.

As the interview progressed, however, it became clear that
many of the things the lieutenant knew about how to make his
leadership style work were picked up on the job, and without much
help from others. For example, he had learned that trusting
soldiers to be where they are supposed to be will work most of
the time, but that a leader needs to establish some "controls"--
unbiased sources of information about how soldiers spend their
time when the "LT" (lieutenant) is not around. The problem was
how to make those controls unobtrusive so that soldiers would
still feel trusted.

The lieutenant's experience suggested a solution to this
problem. He noticed that when he drove up to the motor pool he
always found everyone busy at their appointed tasks. But on an
occasion when he instead <u>walked</u> up to the motor pool, there
seemed to be a bit more standing around, drinking coffee, etc.
Now the lieutenant makes it a practice occasionally to walk up to
the motor pool. He feels that this technique is important to
making his leadership style work. It enables him to monitor the
performance of his soldiers without "riding" them and, thus,
spoiling the climate of mutual trust he has worked hard to
establish.

The lieutenant learned something valuable from his
experience of walking up to the motor pool that day. He learned
a technique that helps him implement the leadership principles he
learned in school and training. We believe that such "lessons of
experience" are extremely important to successful military
leadership, and we are currently engaged in a program of research
intended to explore the nature and consequences of knowledge
acquired in this way. In this program of research, we extend to
the study of leadership a theoretical framework and research
method based on a comprehensive theory of human intelligence
(Sternberg, 1985). This theory seeks to identify the unspoken or

1

tacit knowledge that guides successful practice in a given endeavor. As we will discuss, possession of tacit knowledge has been found to be a useful marker for practical intelligence in a variety of real-world settings.

In this review, we examine civilian and military literature on leadership from a tacit-knowledge perspective. This review is part of a broader research effort to identify, assess, and teach tacit knowledge for military leadership. The first phase of this project is the identification of the tacit knowledge necessary for military leadership at three organizational levels: platoon, company, and battalion. The second phase of this project is the development and validation of instruments for measuring tacit knowledge for military leadership; the third phase is the development of training programs for teaching tacit knowledge for military leadership.

A natural first step in the identification of tacit knowledge for military leadership is a consultation of the relevant literature, both civilian and military. Our objectives in presenting our review of this literature are threefold. First, we seek to present the theory of tacit knowledge in its current form: to state what tacit knowledge is, and to describe how a tacit-knowledge approach is used to study intelligent behavior in real-world settings. Second, we intend to describe the domain to be studied with the tacit-knowledge approach-- organizational leadership in a military setting--by defining what counts, for purposes of our study, as military leadership. Third, we plan to identify substantive tacit knowledge related to military leadership by seeking preliminary answers to the question of what effective military leaders know that less-effective military leaders do not know.

It is important to note that the review is intended to provide preliminary, and not conclusive, answers concerning the content and structure of tacit knowledge for military leadership. The review serves as the first of several converging sources of evidence concerning the content, structure, and significance of tacit knowledge in military leadership. As a later section of this review will make clear, we conceive of tacit knowledge, in part, as knowledge that people tend to learn "on their own." For this reason, we expected that the leadership literature would be limited as a source of evidence about substantive tacit knowledge--particularly when compared with interviews and behavioral observations planned for this project. Even so, we had sound reasons for undertaking a review of the literature.

First, we needed to be sure that we would not overlook published research relevant to the question at hand. Second, we believe that conclusions based on independent, converging sources of evidence are superior to those based on single sources of evidence (Garner, Hake, & Eriksen, 1956). By identifying tacit

2

knowledge through literature review, interviews, and behavioral
observations, we eliminate bias associated with any one source of
evidence and increase confidence in the generalizability of our
conclusions. Third and finally, because interviewing Army
officers is a labor-intensive and data-limited process, we needed
to use preliminary evidence about the content and structure of
tacit knowledge to inform our later data collection efforts.

Overview

In what follows, we present the theory of tacit knowledge in
its current form and describe previous efforts to apply this
theory to the study of intelligent behavior. We next present the
operating definition of leadership that will guide our study of
tacit knowledge for military leadership. We then discuss the
results of a literature search that revealed preliminary evidence
concerning the content and structure of tacit knowledge for
effective military leadership. We conclude with an analysis and
discussion of what we have learned from our search of the
leadership literature.

Tacit Knowledge

Sternberg and his colleagues have sought to understand human
abilities in real-world settings. Following Neisser (1976), they
have distinguished between academic and practical intelligence
(e.g., Sternberg, Wagner, & Okagaki, 1993; Wagner & Sternberg,
1985). Academic intelligence refers to the abilities typically
valued in schools. These abilities include reading or listening
to formal, explicit instruction on the content and rules of a
given discipline; this sort of intelligence is measured by
conventional abilities tests. In contrast, practical
intelligence refers to abilities typically devalued in schools.
These abilities involve observing, imitating, and applying the
informal, unspoken strategies that lead to success in real-world
pursuits. Practical intelligence is the ability to learn about,
rather than of, a discipline, and it is poorly measured by
conventional abilities tests (e.g., Sternberg, 1985; Sternberg &
Wagner, 1993).

Sternberg and his colleagues have taken a knowledge-based
approach to understanding practical intelligence. A major
finding of their research has been that much of the knowledge
necessary for success in real-world pursuits is tacit. Tacit
knowledge is defined as knowledge that is implied by or inferred
from actions or statements (American Heritage, 1993). A large
body of research now suggests that the ability to acquire and use
tacit knowledge is a crucial dimension of practical intelligence
(Sternberg, Wagner, & Okagaki, 1993; Wagner & Sternberg, 1985;
Williams & Sternberg, in preparation). In order to delimit the
tacit-knowledge construct, we briefly discuss what tacit
knowledge is, and what it isn't.

3

What is Tacit Knowledge?

Tacit knowledge is a type of knowledge that previous research has shown to be useful in predicting performance in **real-world endeavors** (e.g., Wagner & Sternberg, 1985; **Williams & Sternberg, in preparation**). This type of knowledge has three characteristic features. First, it is procedural in structure. Second, it is relevant to the attainment of goals that people value. Third, it is acquired with little help from others. Knowledge with these properties is called "tacit" because it often must be inferred from actions or statements. This burden of inference falls both on the individuals who seek to acquire tacit knowledge in work and school (all of us, really), and on the researchers who wish to study these individuals. The goal of this section is to elaborate on the above description of tacit knowledge and to indicate, as clearly as possible, what separates tacit knowledge from knowledge in general. To accomplish this goal, we consider the structure of tacit knowledge, the conditions of its use, and the conditions under which it is acquired. Please note in all that follows that although we have chosen to use the term "tacit" to refer to this important type of knowledge, the intension or content of the tacit-knowledge concept is not fully captured by the meaning of the lexical item "tacit." Tacit knowledge, as we conceive it, is typically implied rather than stated explicitly--but there is more to the tacit-knowledge concept than this most salient feature. We now turn to a discussion of the characteristic features of tacit knowledge.

Tacit Knowledge is Procedural

Tacit knowledge is intimately related to action. It takes the form of "knowing how" rather than "knowing that." This sort of knowledge (knowing how) is called procedural knowledge, and it is contrasted with declarative knowledge (knowing that). More precisely, procedural knowledge is knowledge that is represented in a way that commits it to a particular use or set of uses (Winograd, 1975). An example of procedural (but not tacit) knowledge is "If the light is red then stop." Declarative knowledge, by contrast, is not committed to any particular use. An example of declarative knowledge is "The capital of California is Sacramento."

Procedural knowledge can be represented, formally, as condition-action pairs of the general form:

IF <antecedent condition> THEN <consequent action>

For example, the knowledge of how to respond to a red traffic light could be represented as:

IF   <light is red>   THEN <stop>

4

Of course, the specification of the conditions and actions that
make up proceduralized knowledge may be quite complex. In fact,
much of the tacit knowledge that we have observed seems to take
the form of complex, multi-condition rules for how to pursue
particular goals in particular situations. For example,
knowledge about getting along with one's superior might be
represented in a form with a compound condition:

IF <you need to deliver bad news> AND
    <it is Monday morning> AND
    <the boss's golf game was rained out the day before> AND
    <his staff seems to be "walking on eggs">
THEN <wait until later>

As this example suggests, tacit knowledge is always wedded
to particular uses in particular situations, or classes of
situations. We have found that individuals who are queried about
their knowledge will often begin by articulating general rules in
roughly declarative form (e.g., "a good leader needs to know
people.") When such general statements are probed, however, they
often reveal themselves to be abstract or summary representations
for a family of complexly specified procedural rules (i.e., rules
about how to judge people accurately for a variety of purposes
under a variety of circumstances). This, we believe, is the
characteristic structure of tacit knowledge.

Tacit Knowledge is Practically Useful

Tacit knowledge is practically useful. It is instrumental
to the attainment of goals people value. The more highly valued
a goal is, and the more directly the knowledge supports the
attainment of the goal, the more useful the knowledge. For
example, if knowing that shining one's boots is all that it takes
to win the lieutenant's approval, and if one badly wants this
approval, then this knowledge is highly useful. Alternatively,
if the knowledge that the lieutenant hates scuffed boots is only
one of many things a person needs to know about the lieutenant to
win his approval, or if one does not much care about winning the
lieutenant's approval, then this knowledge is lower in
usefulness.

We do not believe that practically-useful knowledge must be
acquired in any particular context or forum. Useful knowledge
is, of course, acquired in classrooms, in apprenticeship
programs, through self-study, etc. We distinguish practically-
useful knowledge not from formally-acquired knowledge but,
rather, from knowledge (however acquired) that is not relevant to
practical goals an individual values. For example, during Army
basic training, keeping a tightly made bed is valued because it
serves the valued goal of avoiding punishment from a drill
instructor. During basic training, then, knowledge about making
a tight bed should be practically useful--it is instrumental to

the attainment of a valued goal. Later in a soldier's career, when the soldier has moved off of the post, the goal of a tight bed is less highly valued and new knowledge about how to make a tight bed is lower in practical usefulness (as we define it here.) Note that the practical usefulness of knowledge is a continuous, and not discrete, dimension of variation.

Tacit Knowledge is Acquired Without Direct Help from Others

Tacit knowledge is acquired on one's own. It is knowledge that is unspoken, underemphasized, or poorly conveyed relative to its importance for practical success. Tacit knowledge is acquired under conditions of minimal environmental support. By environmental support, we mean either people or media that help the individual to acquire knowledge.

When people or media support acquisition of knowledge, they facilitate the three knowledge-acquisition components specified in the triarchic theory of human intelligence: selective encoding, selective combination, and selective comparison (Sternberg, 1988). That is, when an individual is helped to distinguish more from less important information, is helped to combine elements of knowledge in useful ways, and is helped to identify knowledge in memory that may be useful in the present, then we say that the individual has been supported in acquiring this knowledge. To the extent that this help is absent, we say that the individual has not been supported. Note that, like usefulness of knowledge, level of environmental support for acquisition of knowledge is a continuous dimension.

What Sort of Concept is Tacit Knowledge?

Having described the characteristic features of tacit knowledge, we need to say something about tacit knowledge as a theoretical concept. Tacit knowledge is a concept developed in empirical studies of practical intelligence. Sternberg and colleagues used the term "tacit knowledge" to refer to a type of knowledge, the possession of which, they found, distinguished practically-successful from less-practically-successful individuals. Tacit knowledge is thus an ostensive term, one that "points to" an important type of knowledge.

The goal of this section is to make three observations about tacit knowledge as a theoretical concept. The first observation is that tacit knowledge is a natural, and not a nominal or "classical," concept. The second observation is that tacit knowledge is a coherent concept, held together by a set of causal explanations that link its characteristic features to one another. The third observation is that, although tacit knowledge is most naturally defined with respect to the individual, it may be extended to the analysis of competent performance among classes of individuals.

6

Tacit Knowledge is a Natural Rather than a Nominal Concept

It is helpful to begin by distinguishing two types of concepts: nominal and natural concepts. Nominal concepts are used attributively. For example, we use the term "bachelor" to attribute certain features (i.e., male, adult, never married) to some objects/persons in the world. By contrast, natural concepts are used ostensively. For example, we use the term "furniture" to refer to objects in the world that we want to treat as equivalent (e.g., dresser, chair, table).

These two types of concepts are held together differently as well. The instances of a nominal concept often share features that are both necessary (i.e., all valid instances must have them) and sufficient (i.e., having them is enough to qualify something as a valid instance). This type of concept is often called "classical" because of its importance in Aristotelian logic. Membership in a classical concept is "all or none"-- either an instance possesses the critical features or it does not.

The instances of a natural concept share characteristic (rather than necessary and sufficient) features. Natural concepts are also held together by causal relationships that link features to one another. Membership in a natural-kind concept is not "all or none," but, rather, a matter of resemblance: Instances are judged in terms of their strength of resemblance to the concept. This means that some instances (those with high resemblance) will be judged as better examples of the concept than will other instances (those with low resemblance). For example, most people say that "arm chair" is a better, more typical example of the concept of furniture than is "bean bag chair."

Tacit knowledge is a natural, and not a nominal or classical concept. It is used ostensively--to point to a type of knowledge that is implicated in practical intelligence. It is held together by the resemblance of tacit-knowledge items to one another and not by a set of individually necessary and jointly-sufficient features. Note that this lack of necessary and sufficient features does not mean that tacit knowledge is an incoherent or meaningless concept. Two people may be unable to generate the critical features that all items of furniture (and no items of non-furniture) share, but they will still be able to agree that furniture exists and that a coffee table is furniture and an oil painting is not.

Because tacit knowledge is a natural concept, we should not expect that judgments about what is and is not tacit knowledge will be "all or none." Rather, judgments should depend on an item's strength of resemblance to the concept. Thus, some

7

knowledge will seem to be a particularly clear example of tacit knowledge and other knowledge will seem marginal. For marginal items, individuals may disagree about whether or not the item is a valid instance of tacit knowledge (just as individuals may differ over whether or not a hammock is a piece of furniture). Given general agreement among judges, however, the "tacitness" of knowledge items can be determined with some confidence.

Tacit Knowledge is Coherent Because the Relations Among its Features are Non-Arbitrary

We have specified three characteristic features of tacit knowledge: (1) procedural structure, (2) high usefulness, and (3) low environmental support for acquisition. An important part of what makes the tacit-knowledge concept a "coherent" one is the fact that these features are related to one another in non-arbitrary ways. In other words, we can explain why these features would go together in the specification of a natural category of knowledge. We believe that this explanation strengthens our argument that tacit knowledge should be considered a well-formed natural concept.

First, it makes sense that procedural structure and high usefulness should both characterize a natural category of knowledge. Proceduralized knowledge tends also to be practically useful. Procedural knowledge contains within it the specification of how it is to be used. Declarative knowledge, in contrast, is non-specific with respect to use and, as a consequence, may remain unused or "inert." Thus, procedural knowledge is more likely (than knowledge otherwise structured) to be instrumentally relevant in the pursuit of personally-valued goals.

It also makes sense that high usefulness and low environmental support should both characterize a natural category of knowledge. Knowledge that is acquired in the face of low environmental support often confers a comparative advantage and thus tends to be practically useful in a competitive environment. When knowledge must be acquired in the face of low environmental support, the probability that some individuals will fail to acquire it increases. When some individuals fail to acquire knowledge, others who succeed in acquiring the knowledge may gain a comparative advantage over them. Note that the magnitude of this advantage would be lower if the knowledge in question were highly supported by the environment (i.e., explicitly and effectively taught) because we would expect more people to acquire and use it. Because many of the goals that individuals personally value are pursued in competition with other people, we may speculate that knowledge acquired under conditions of low environmental support is often particularly useful. This knowledge is more likely to differentiate among individuals than is highly supported knowledge.

8

Finally, it makes sense that low environmental support and procedural structure should both characterize a natural category of knowledge. Proceduralized knowledge is difficult to articulate and, thus, more likely to be omitted from discussion or poorly conveyed. People know more than they can easily tell and procedural knowledge is often especially difficult to articulate. Furthermore, procedural knowledge may become so highly automatized that people lose access to it completely. For these reasons, procedural knowledge is more likely than declarative knowledge to be acquired under conditions of low environmental support.

The above discussion suggests that there is more to the tacit-knowledge concept than a set of features, assembled *ad hoc* in order to explain regularities in correlational data. Rather, the tacit-knowledge concept is a coherent one, described not simply by a set of characteristic features, but also by a set of non-arbitrary relations among those features.

Tacit Knowledge May Be Characterized at the Level of Individuals or Classes of Individuals

Tacit knowledge is most naturally defined with respect to the individual, but it may be extended to the analysis of competent performance among classes of individuals. For example, the usefulness of a given piece of knowledge is most naturally defined with respect to an individual--it depends on what he or she values. Indeed, it is hard to see how usefulness could be defined in any other way. At this level of analysis, given honest information about what that individual wants, it is possible to judge the usefulness of knowledge with some confidence. When we must evaluate the usefulness of a given piece of knowledge with respect to a class of individuals, however, our confidence will necessarily be lower: We should expect that the goals we attribute to all members of the class will, for some members, be incorrect.

As a class of individuals grows more heterogeneous (e.g., from combat-support commanders to commanders to officers), our judgments will grow more and more approximate and there will be more and more basis for disagreement about the usefulness of knowledge and, thus, about what qualifies as an instance of tacit knowledge. This is not to say that an acceptable degree of consensus cannot be reached when deciding on what constitutes tacit knowledge for a class of people, but simply that reaching consensus will grow more difficult as a class grows more heterogeneous.

Like usefulness of knowledge, the level of support for knowledge acquisition is most naturally defined with respect to an individual--it depends on his or her particular experience in training and on the job. Thus, what is acquired under low

9

environmental support for one individual may be acquired under high environmental support for another individual simply because the two individuals' experience has been different. When we judge level of environmental support with reference to classes of individuals, of course, we introduce variability (among class members). In so doing, we introduce error into our judgments about the level of support attending the acquisition of a given instance of knowledge. As in the case of knowledge usefulness, this loss of precision will increase with the heterogeneity of a class of individuals and will decrease with our ability to specify sub-classes when making judgments.

Tacit Knowledge is Described at Three Levels of Abstraction

It is helpful to consider three qualitatively distinct levels of description or abstraction that we employ in theorizing about tacit knowledge. At the lowest, least abstract level, tacit knowledge is described as mentally-represented knowledge structures. We believe that these knowledge structures take the form of complex, condition-action mappings. It is at this level of description, the level of mentally-represented procedures, that tacit knowledge has its psychological reality and its consequences for intelligent behavior.

In an ideal world, we would be able to measure possession of tacit knowledge directly at this level. In a non-ideal world, we must infer possession of tacit knowledge from subjects' behavior. In particular, we must infer possession of tacit knowledge from subjects' articulated knowledge. When knowledge is articulated in published articles and interviews, it is greatly simplified. That is, complex knowledge structures that map sets of antecedent conditions onto consequent actions get summarized and abbreviated into simpler, less complexly-specified procedures. It is at this level, the level of the tacit knowledge "item," that we presently elicit and record people's tacit knowledge. It is also at this level that we measure tacit knowledge. That is, we use tacit-knowledge items to develop problem scenarios that subjects solve by rating response options, and these ratings provide the basis for assessing subjects' possession of tacit knowledge.

At a higher, more abstract level of description, tacit-knowledge items can be grouped into categories of functionally-related items. These categories are presented, in preliminary form, for the military leadership case in a later section of the review. Category-level description adds value to the identification of tacit knowledge by illuminating the broad, functional significance of different aspects of tacit knowledge. Furthermore, category-level description adds value to instrument development by allowing us to characterize subjects' tacit knowledge in terms of functional areas or competencies.

10

What Tacit Knowledge is Not

Having said what tacit knowledge is, and what sort of concept we believe it to be, it is helpful to distinguish tacit knowledge from related concepts.

Tacit Knowledge is Not Synonymous with Either Informal Knowledge or Individually-Acquired Knowledge

In previous writings on tacit knowledge, the construct has frequently been contrasted with formally-acquired or academic knowledge. This contrast has been drawn because, typically, tacit knowledge is acquired outside the classroom. As an earlier section of this review makes clear, however, the relationship between informal settings and tacit knowledge is not strictly necessary. That is, what makes an item of knowledge tacit is not the context or venue in which it is acquired (e.g., classroom, job site, etc.) but rather the level of support for knowledge acquisition that the environment provides. In practice, this criterion often means that knowledge acquired "on the job" is more likely to be classified as tacit than is knowledge acquired in the classroom. But other possibilities exist; for example, knowledge acquired under conditions of low environmental support in the classroom.

In the military domain, the treatment of informal knowledge as coextensive with tacit knowledge is particularly problematic. Much learning of a "hands on" or experiential nature takes place under formal mandate. For example, operational assignments form one of three complementary processes by which Army leaders are developed. When learning that takes place on the job is thus classified as formal, the commonplace use of that term is lost and the association "in practice" between informal and tacit knowledge no longer obtains. To reiterate our position, we classify as tacit only that knowledge that is acquired under conditions of low environmental support for acquisition. Whether this support is provided by a classroom teacher, by a mentor on the job, or by a book used in self study is, in principle, irrelevant. Still, we expect that formally-mandated learning of the "on-the-job" variety will be more likely to result in acquisition of tacit knowledge than will formally-mandated learning of the classroom variety--for reasons described above.

A similar distinction between an association in practice and an association in principle must be made with regard to collective and individually-acquired knowledge. In principle, tacit knowledge may be either widely shared (i.e., general cultural knowledge) or not (i.e., individual knowledge). In practice, however, general cultural knowledge that is widely shared is likely to be widely shared because its acquisition is well supported by the environment. For this reason, we expect that knowledge that is classified as tacit will not, typically,

11

be widely shared. Recall that one of the reasons tacit knowledge is associated with practical success is that it confers a comparative advantage on those who possess it.

Tacit Knowledge is Not a Proxy for General Intelligence

Tacit knowledge is not a proxy for general intelligence. Neither is it a proxy for personality or cognitive style. Although these resources may support the acquisition and use of tacit knowledge in important ways, tacit knowledge is not reducible to any one of them. Research by Sternberg, Wagner, and others (Sternberg & Wagner, 1993; Sternberg, Wagner, & Okagaki, 1993) shows that the predictive value of tacit knowledge with respect to job performance is not due simply to correlations of measures of general intelligence, personality, or style with scores on tacit-knowledge inventories. In general, correlations between tacit knowledge and conventional ability measures are trivially low.   When scores on a tacit-knowledge inventory for management were entered into a hierarchical regression analysis after IQ scores, the incremental contribution to the prediction of performance in a managerial simulation was .32. By contrast, the incremental contribution of adding IQ scores to tacit knowledge was .09. Similarly, tacit-knowledge scores have been shown to be significantly better predictors of job performance than measures of personality or cognitive style (Sternberg & Wagner, 1993). In summary, there is good reason to believe that the ability and propensity to acquire tacit knowledge is an important dimension of practical intelligence that conventional ability, personality, and style assessments fail to measure adequately.

Tacit Knowledge is Not the Same as "Careerism"

Although tacit knowledge is knowledge necessary to succeed, it is not reducible to "careerism" or getting ahead at others' expense. Tacit knowledge, as we define it, may serve both cooperative and competitive goals. Indeed, Williams and Sternberg (in press) found that a crucial category of tacit knowledge for management success was that of supporting and cooperating with others. The question of how personally-valued goals relate to the best interests of the organization and, thus, of what should and should not count as tacit knowledge for military leadership is clearly an important one, however. We provide a detailed treatment of this question in a later section of this review.

Tacit Knowledge is Not Sufficient for Effective Performance

Finally, tacit knowledge is not sufficient for effective performance. Successful performance usually requires general intelligence in (at least) the normative range, motivation to succeed, non-tacit domain knowledge, and many other resources.

Our approach does not deny the importance of these factors, but rather attempts to supplement them and improve upon conventional approaches to understanding, predicting, and improving performance in real-world settings.

Theoretical and Empirical Background for the Tacit-Knowledge Approach

The tacit-knowledge approach is related to a comprehensive theory of human intelligence--Sternberg's triarchic theory (Sternberg, 1985). Among other things, this theory specifies the functional role of intelligent behavior and the cognitive mechanisms through which knowledge is acquired. In what follows, we briefly discuss these aspects of the triarchic theory with respect to tacit knowledge. These ideas are covered more fully in Sternberg's book, Beyond IQ (1985).

What Tacit Knowledge is For

According to the triarchic theory, intelligence is defined as the "purposive adaptation to, selection of, and shaping of real world environments relevant to one's life and abilities" (Sternberg, 1988, p. 65). Tacit knowledge is an important part of practically-intelligent behavior because it helps people accomplish these basic functions. This is what tacit knowledge is for--adapting to, selecting, and shaping one's external environment.

Adapting to an environment means modifying one's behavior to meet the requirements of that environment. Tacit knowledge can play an important role in such adaptation. For example, if a company commander who is used to operating with a great deal of autonomy gets a new battalion commander whose leadership style is to micro-manage, the company commander should change her behavior and let the battalion commander have more access to information about the activities of the organization. By sharing more information about her decisions concerning the company's activities, the commander can satisfy her boss' need for tight control and, at the same time, demonstrate her competence to run the organization. The demonstration of competence builds trust with the battalion commander, which may result in more autonomy for the company commander. Thus, by changing or adapting her behavior, the company commander is able to adapt to her new environment and possibly maintain autonomy to command.

Sometimes an individual is unwilling or unable to adapt and must instead find a new context in which to pursue success. In this case, a new environment is selected and, again, tacit knowledge can be essential. For example, an experienced tank-platoon leader who is having trouble adapting to a new company commander who micro-manages may let it be known around the battalion that he is interested in the job of battalion support

13

platoon leader, a position that would give him more autonomy as a leader. Also, he might communicate his interest in the position to his new commander on his Officer Evaluation Report (OER) support form. His tacit knowledge of how to use formal and informal communications in the battalion would help him express his interest in the position without alienating his company commander.

Sometimes individuals are able neither to adapt to a particular feature of their environment nor to select another one in which to pursue success. When individuals cannot adapt to or select their environment they may act to modify the environment rather than their own behavior. As with adaptation and selection, tacit knowledge can help individuals shape their environments. For example, if the platoon leader in the previous example is unable to get a transfer to the support platoon and is unwilling to change his behavior, he might try to shape the current environment. In order to shape the environment to his expectations and talents, he might attempt to persuade the new company commander that giving platoon leaders autonomy for some aspects of their jobs (e.g., platoon-level training and maintenance) develops initiative and promotes leader growth. If the platoon leader is successful in persuading the company commander to micro-manage less, he has shaped the environment to fit his needs or expectations.

How Tacit Knowledge is Acquired

The triarchic theory describes three basic mechanisms through which knowledge is acquired: selective encoding, selective combination, and selective comparison. When individuals acquire new knowledge through selective encoding, they distinguish relevant information from irrelevant information. When individuals acquire new knowledge through selective combination, they put pieces of relevant information together to form more complex knowledge structures. When individuals acquire new knowledge through selective comparison, they use information that has been relevant in the past to facilitate learning in the present.

As their names suggest, the three knowledge-acquisition components are based on selectivity--distinguishing more from less useful information. In the case of selective encoding, the selection is among elements in an array of information. In the case of selective combination, the selection is among possible combinations of selected elements. In the case of selective comparison, the selection is among stored knowledge structures that may be relevant to the current situation. All three types of selectivity can be observed in the acquisition of tacit knowledge.

14

The Tacit-Knowledge Approach Has Been Effective
in Other Domains

One of the most important reasons for adopting a tacit-knowledge approach to the study of leadership is that, in previous research, such an approach has been successful in elucidating practical intelligence and performance in domains as diverse as high-technology manufacturing, bank management, academic psychology, and sales. In what follows we describe some of the major findings of this research program.

Instruments

Research has shown that tacit knowledge can be effectively measured (Wagner, 1987; Wagner & Sternberg, 1985; Williams & Sternberg, in preparation). The measurement instruments employed by Wagner and Sternberg typically consist of a set of work-related situations, each with between 5 and 20 response items. Each situation posed a problem for the subject to solve, and the subject indicated how he or she would solve the problem by rating the various response items. For example, in a hypothetical situation presented to a business manager, a subordinate whom the manager does not know well has come to him for advice on how to succeed in business. The manager is asked to rate each of several factors (usually on a 1 = low to 9 = high scale) according to their importance for succeeding in the company. Examples of factors might include: (1) setting priorities that reflect the importance of each task, (2) trying always to work on what you are in the mood to do, and (3) doing routine tasks early in the day to make sure you get them done. The set of ratings the subject generates for all the work-related situations is the measure of his tacit knowledge for that domain.

Similarly, the tacit-knowledge measurement instrument developed by Williams and Sternberg (in preparation) contains statements describing actions taken in the workplace, which subjects rate for how characteristic the actions are of their behavior. In addition, complex open-ended problem situations are described, and subjects are asked to write plans of action showing how they would handle the situations.

Scoring

The procedure for scoring a tacit-knowledge test has undergone evolution across several studies, and we will briefly describe various scoring approaches here. In Wagner and Sternberg's (1985) study, the tacit-knowledge test was scored by correlating ratings on each response item with a dummy variable representing group membership (e.g., 3 = experienced manager, 2 = business school student, 1 = undergraduate). A positive correlation between item and group membership indicated that higher ratings were associated with greater levels of expertise

15

in the domain, whereas a negative correlation indicated that higher ratings were associated with lower levels of expertise in the domain. Items showing significant item-group correlations were retained for further analysis. Ratings for these items were summed across items in a given subscale and these summed values served as predictor variables in analyzing the relationship, within groups, between tacit knowledge and job performance.

A second procedure for scoring tacit-knowledge tests was employed by Wagner (1987). A sample of practically-intelligent individuals (this time, academic psychologists) was obtained through a nomination process. The tacit-knowledge test was administered to these individuals and an expert profile was generated that represented the central tendency of their responses. Tacit-knowledge tests for subjects were scored, separately for each item subscale, as the sum of their squared deviations from this expert profile. Note that this scoring method, unlike that described previously, allows for meaningful comparisons between groups.

A third procedure for scoring tacit-knowledge tests was employed by Wagner, Rashotte, and Sternberg (cited in Sternberg et al., 1992). In a study of tacit knowledge for sales, they collected "rules of thumb" through reading and interviews. These rules of thumb were grouped into categories and used to generate a set of work-related situations. Response items were constructed so that some items represented correct application of the rules of thumb, whereas other items represented incorrect or distorted application of the rules of thumb. The tacit-knowledge test was scored for the degree to which subjects preferred response items that represented correct applications of the rules of thumb.

Findings

Regardless of the scoring method employed, tacit knowledge has repeatedly been found to increase with experience in a domain. For example, in their study of salespeople, Wagner, Rashotte, and Sternberg (cited in Sternberg, Wagner, & Okagaki, 1993) found that scores on a tacit-knowledge test, based on a rule-of-thumb metric, increased with experience for both local (i.e., short-term) and global (i.e., long-term) tacit knowledge. Similar results have been reported in studies of bank managers and academic psychologists (Wagner, 1987).

Even when level of experience is held roughly constant, tacit-knowledge scores have been found to predict job performance according to a variety of criterion measures. For example, in a study of managers of high-technology manufacturing companies, Williams and Sternberg (in press) found that tacit-knowledge test scores correlated significantly with compensation (.39), compensation corrected for age (.38), and subject's level within

16

the organization's reporting structure (.36). These correlations were significant even when subjects were equated for level of experience. Similar results have been obtained, using different criterion measures, in studies of bank managers (Wagner & Sternberg, 1985), academic psychologists (Wagner, 1987), and sales people (Wagner, Rashotte, & Sternberg, cited in Sternberg, Wagner, & Okagaki, 1993).

Wagner and Sternberg (1986) have distinguished several aspects of tacit knowledge, including three categories and two orientations of tacit knowledge. The categories are self-explanatory; they include tacit knowledge about managing oneself, tacit knowledge about managing tasks, and tacit knowledge about managing others. The tacit-knowledge orientations are perspectives that govern the use of tacit knowledge. A local orientation refers to a focus on the short-term accomplishment of the specific task at hand; a global orientation refers to a focus on one's long-range, career-related goals.

Each aspect of tacit knowledge described above corresponds to a subset of items on a tacit-knowledge test. When Wagner and Sternberg (1985) examined the intercorrelations of scores on these subscales, they found evidence for a general factor of tacit knowledge: Inter-scale correlations were significant and positive, indicating that subjects who scored high on one subscale (e.g., local tacit knowledge for managing the self) tended to score high on the others as well (e.g., global tacit knowledge for managing others). Similar results have been reported by Wagner (1987), as well as by Williams and Sternberg (in press), who employed an elaborated version of the tacit-knowledge framework described above. The framework developed by Williams and Sternberg influenced the formation of categories of tacit-knowledge for military leadership. For this reason, we treat the Williams and Sternberg findings in some detail below.

Tacit Knowledge for Managers

The tacit-knowledge structure developed by Williams and Sternberg was content related, meaning that the delineation and labeling of the categories indicated different aspects of the content of tacit knowledge for business management. The goal of the framework was not to form completely distinct categories with no interactions. Rather, the goal was to create a structural outline of tacit knowledge that captured the significant aspects of this knowledge and organized them into a sensible framework. This framework then served as a guide for identifying and understanding the content and relative distribution of tacit knowledge throughout the managerial career.

Williams and Sternberg conceived of tacit knowledge for business management as consisting of three domains, the intrapersonal, the interpersonal, and the organizational. In

17

Williams and Sternberg's usage, the intrapersonal domain contains knowledge about behaviors relating to the self and the interrelationship of the self and the environment. The interpersonal domain contains knowledge about behaviors relating to other people. The organizational domain contains knowledge about behaviors relating to the organization.

The intrapersonal domain comprises four aspects of tacit knowledge: challenge orientation, control orientation, personal effectiveness (self-oriented), and personal effectiveness (context-oriented). Challenge orientation refers to the propensity for choosing and enjoying situations that represent a challenge--situations that require the breaking of new ground and the learning of new areas and skills. Control orientation refers to the tendency to take charge of situations and to place oneself in control. Self-oriented personal effectiveness refers to the degree to which one is effective within the self. This aspect of tacit knowledge encompasses three behavioral areas: self-direction and self-motivation, self-examination and self-awareness, and organization. Basically, these areas translate to the ability to motivate and direct oneself, the ability to examine and understand oneself, and the ability to organize oneself. Context-oriented personal effectiveness refers to the degree to which one is effective in context. This aspect of tacit knowledge encompasses two areas: tasks (how effective one is at problem solving and decision making) and environment (how effective one is at understanding and operating within the business world in general).

The interpersonal domain of tacit knowledge consists of knowledge about behaviors that relate to others. There are three categories of interpersonal tacit knowledge: influencing and controlling others, supporting and cooperating with others, and understanding others. (When we influence and control others, the direction of interpersonal action is from the self to others. When we support and cooperate with others, the interpersonal action operates in both directions. When we understand others, the direction of interpersonal action is from others to the self.) Within each of these three categories, there are three aspects of tacit knowledge: superiors, subordinates, and peers and outsiders. These aspects represent the work relationships in which tacit knowledge is relevant. The form of these relationships can be thought of as interactions with those above one in the hierarchy, interactions with those below one in the hierarchy, and interactions with those at a comparable level or outside of the hierarchy. Thus, for each of the three primary types of work relationships (relationships with superiors, subordinates, and peers and outsiders), there are three relevant categories of tacit knowledge (influencing and controlling others, supporting others, and understanding others).

The organizational domain of tacit knowledge consists of knowledge about behaviors relating to the organization in general. There are three categories of organizational tacit knowledge: optimizing the system, defining the organization, and envisioning the future. Optimizing the system refers to behavior designed first to evaluate the people working within the system and the jobs they will perform, and second, to match people to jobs and tasks throughout the organization to create the most functional system. Defining the organization refers to the acts involved in articulating and locating challenges the system is best equipped to handle. It entails reviewing and choosing products and services that the organization will offer and excel at and that the marketplace will receive positively. Envisioning the future refers to the behavior associated with designing the future position of the organization based on an analysis of the world marketplace in general, and the strengths and weaknesses of the company in particular. It is in envisioning the future that the leader creates the vision he or she can then use to empower his or her subordinates.

In every case, the aspects of tacit knowledge reflected in this framework represent one conceptualization of the structure of what successful people know. The framework predicts that a well-rounded successful executive will possess tacit knowledge for each aspect and within each category. It is obvious that the categories influence one another and are not mutually exclusive (for example, one's control orientation influences one's effectiveness at tasks and one's ability to support and cooperate with others). However, the categories represent a framework indicating how tacit knowledge may reasonably be thought to be organized in the mind of the successful executive.

In summary, an extensive program of empirical research has shown that tacit knowledge can be measured, that it increases with domain experience, and that it can predict job performance, even when level of domain experience is held constant. Most recently, research by Williams and Sternberg provides evidence about what successful civilian managers know, how that knowledge is distributed over functions associated with the managerial role and over levels within the organization, and how mastery of tacit knowledge relates to job success.

Military Leadership

Our goal is to apply the tacit-knowledge approach to military leadership. In so doing, we intend to extend the theory of tacit knowledge to a new area of interest. Since our interest is in tacit knowledge for military leadership, we rely on the Army's conception of leadership to delimit the scope of the research. The Army's view on leadership is codified in three documents that address leadership at different organizational levels: Field Manual 22-100, Military Leadership; Field Manual

19

22-103, <u>Leadership and Command at Senior Levels</u>; and Department of the Army Pamphlet 600-80, <u>Executive Leadership</u>. Field Manual 22-100 outlines the military leadership framework for the entire Army, but its main focus is on leadership at the junior levels (through battalion command). According to Field Manual 22-100 (p. 1), leadership is defined as "the process of influencing others to accomplish the mission by providing purpose, direction and motivation." Field Manual 22-103 focuses on leadership at intermediate organizational levels--brigade through corps in the Army. This document defines leadership as an influence process in which direct and indirect means are used to create conditions for sustained success of an organization. Department of the Army Pamphlet 600-80 addresses leadership at the highest levels of the military and defines the concept of leadership as obtaining the commitment of subordinates to the organization's purposes and goals, beyond the level that is possible by using position power alone.

From these definitions, it is clear that the Army defines leadership as an interpersonal-influence process in which direct and indirect means are used to get others to accomplish the organization's goals by providing purpose, direction, and motivation. Taken together, the definitions suggest that leadership is more than headship; the ability to influence is not based solely on formal authority or position power. The word "other" is used in this definition because a leader may have to exercise influence beyond the organization's boundaries in order to accomplish the mission. The doctrine assumes that leadership processes are qualitatively different at various levels in the military hierarchy. Hence, different doctrinal manuals are employed at the different levels.

The Army doctrine has less to say about management. The only reference to management in Army doctrine is in Field Manual 22-103 (p. 44), which defines management as a set of expected activities or behaviors "performed by those in senior positions to acquire, direct, integrate, and allocate resources to accomplish goals and tasks." From this definition it is clear that management involves functions associated with resource acquisition, coordination, and allocation. Hence, the doctrine assumes that management functions are part of the military leader's role. Indeed, all roles are labeled "leader" rather than "manager."

Leadership Versus Management

The relationship between leadership and management has been debated for decades by academics and practitioners. Two alternative positions have emerged concerning the relationship between leadership and management: The concepts are distinct, or the concepts overlap. According to the first position, management and leadership are qualitatively different and

20

mutually exclusive concepts. Those who draw a sharp distinction between the two concepts often speak of leaders and managers, rather than of leadership and management. For example, Zaleznik (1977) proposed that managers and leaders are different types of people in terms of their motivation, personal history, and how they think and act. He views managers as problem solvers who create goals out of necessity to maintain the status quo. He views leaders as visionaries who inspire workers to take part in their own, and in the organization's, development and change. Similarly, Bennis and Nanus (1985) propose that leaders and managers differ qualitatively in their perspectives and willingness to implement change. Managers have a very narrow perspective that is concerned with mastering routines to ensure efficiency of daily operations: Leaders have a broad perspective that allows them to assess the organization's needs, envision the future, and implement changes. In contrast, Kotter (1987) suggests a qualitative difference between leadership and management, but frames the difference in terms of process rather than personality types. According to Kotter, the major difference between the two concepts is that management processes tend to be formal, scientific, and universal, while leadership processes tend to be informal, flexible, inspirational, and future-oriented.

A second position views the two concepts as overlapping processes for fulfilling the functions or expectations of an organizational role. For example, Mintzberg (1975) notes that one of the functions of the manager's role is to be a leader. He is suggesting that "manager" is a role label, "leader" is a role function, and, by extension, leadership is a process associated with the function of leader. Yukl (1989) and Lau and Shani (1992) suggest that the functions associated with supervisory positions in organizations require the incumbent to be both a leader and a manager. Put another way, supervisors must practice both leadership and management in order to fulfill role expectations. These scholars refuse to make a distinction between leader and manager, and use the terms interchangeably in their writings. Bass (1988) also suggests an overlap in processes for meeting role expectations--leaders must manage and managers must lead. So, too, Rost (1991) views leadership and management as processes associated with a role, but he suggests that they differ in terms of bases of influence, direction of influence, and purpose of influence.

In our view, the U.S. Army's doctrine on leadership favors the overlap position in the management-versus-leadership controversy. The Army uses the term "leader" to refer to all incumbents in supervisory positions in military organizations. Thus, the term leader provides a role label in the military context in the same way that the term "manager" provides a role label in civilian organizations. We expect that the functions associated with the role of military leader are similar to the

functions associated with supervisory positions in civilian organizations. Leadership and management are processes used to fulfill role expectations. Both processes are necessary for an incumbent to meet supervisory role requirements. From the Army's point of view, the distinction between leadership and management is that leadership represents a set of processes that entail exerting influence upon others in order to meet the organization's goals. Thus, the present study focuses on identifying and measuring tacit knowledge that pertains to how an incumbent of a supervisory role in a military organization (called a "leader") influences others to accomplish the organization's goals.

Sternberg and associates applied the tacit-knowledge approach to identify the informal knowledge associated with career success in civilian managers, and to develop a measure that would predict their success (Wagner, 1987; Wagner & Sternberg, 1985; Williams & Sternberg, in preparation). Sternberg and associates do not explicitly address the leadership-versus-management distinction. Instead, they focus on identifying the tacit knowledge associated with success of incumbents in managerial roles. In this research, we investigate directly the tacit knowledge associated with leadership, defined as the interpersonal influence of others directed toward the accomplishment of goals for the good of the organization. Our setting is military organizations. Furthermore, this study explores qualitative differences in the tacit knowledge at each of three organizational levels in the military: platoon, company, and battalion. These levels correspond to the direct level of leadership (as specified in Field Manual 22-100). Based on the propositions of stratified systems theory (Jacobs & Jaques, 1987), we expect to find subtle differences in the content of tacit knowledge about leadership at each of these three organizational levels.

Practical Benefits of a Tacit-Knowledge Approach to Military Leadership

Because tacit knowledge can be measured, and because measured tacit knowledge has been found to predict job performance in a number of domains and on a variety of performance criteria, the tacit-knowledge approach should have practical value in the assessment, selection, and training of future leaders. As described above, research suggests that tacit knowledge is acquired through experience, but that individuals may differ in what and how much they learn from experience. Scores on a well-validated tacit-knowledge test should provide a practically useful measure of what an individual has learned about leadership from experience. When leadership knowledge for a particular organizational level is also associated with effective performance at successive levels, this test should provide some indication of how well the individual will perform

22

Overall, we found very little research on what, exactly, leaders know, and how what they know relates to their performance as leaders. For example, out of 923 pages in <u>Bass and Stogdill's Handbook of Leadership</u>, less than one page is devoted to research on what leaders know about how to lead (Bass, 1988). Published reviews of the literature confirm this impression (Hollander, 1985; Yukl, 1989). Army-sponsored research has also failed to address directly the issue of leader knowledge. Recent research in this area has focused on both the nature of leaders' work (Korotkin et al., 1985; Steinberg & Leaman, 1990) and on the "person competencies" required for that work (Mumford et al., 1991), but none of this research has looked directly at <u>what</u> leaders know about how to lead.

When the issue of knowledge is addressed in leadership research and theorizing, there are (for our purposes) several common problems. First, when terms like "knowledge," "skill," or "competence" appear in leadership models, they often serve merely as placeholders in models whose main purpose is to decompose leadership into its sub-parts or processes. For example, Yukl's (1989) framework lists "technical skill," "conceptual skill," and "interpersonal skill" as leader characteristics, but the action in this model is clearly in specifying relationships among classes of variables, not in understanding the contribution of particular types of skill or knowledge to leader performance.

A second common problem with the treatment of leader knowledge is the level of generality at which that knowledge is described. When knowledge <u>is</u> addressed in leadership research it is described quite generally--in terms of broad classes or categories of knowledge. For example, in giving examples of knowledge required of military officers, Mumford et al. (1985) describe knowledge of "informal networks":

> Has knowledge of alternative, informal ways of accomplishing tasks within the organization (Mumford et al., 1985, cited in Mumford et al., 1991, p. 33).

Although it is undoubtedly useful to identify classes or categories of leader knowledge, the approach we advocate relies on a more precise enumeration of what leaders know (e.g., what <u>are</u> the alternative, informal ways of accomplishing tasks), and on a distinction between what they are taught explicitly and effectively and what they must pick up on their own. Such an enumeration of particular leadership knowledge is not found in leadership research to date.

Finally, when leader knowledge is addressed in leadership research, it is often combined with ability and personality factors under the general rubrics "skill" or "competence," or under composite constructs such as "knowledge, skills, abilities, and personality constructs" (KSAP's)(Mumford et al., 1991). In

24

these analyses, what leaders know becomes difficult to separate from what leaders are capable of or what they are like--and this treatment again differs from the tacit-knowledge approach we advocate. In summary, we have found no research that has systematically explored the things that people in leadership roles know, tacit or otherwise, about how to succeed as leaders.

Military doctrine addresses the issue of leader knowledge much more thoroughly than does the civilian research literature. Army leadership doctrine specifies broad categories of knowledge relevant to leadership (Headquarters, Department of the Army, 1990). These "things a leader must know" include: (1) standards, (2) yourself, (3) human nature, (4) your job, and (5) your unit. Army doctrine also specifies nine leadership competencies--things a leader must be able to do. The nine competencies were developed during the 1970's through a wide-ranging study of military officers at all command levels. The nine competencies include: communications, supervision, teaching and counseling, soldier team development, technical and tactical proficiency, decision making, planning, use of available systems, and professional ethics (Headquarters, Department of the Army, 1990). The nine competencies, and their descriptions, provide an important outline of what leaders need to be able to do. Finally, Army field manuals contain important practical knowledge, at a more detailed level, about the combat environment and the human response to it, and about how to motivate, counsel, and train soldiers.

Army leadership doctrine underlies all institutional leadership training in the Army. It is taught in the Army school system, it is disseminated in the form of field manuals and training materials, and it is reiterated in performance evaluations and in leadership development/mentoring sessions. As a consequence, acquisition of the leadership knowledge contained in Army doctrine is often highly supported and, thus, is not classified as tacit knowledge. A central purpose of the current research is to learn what knowledge, above and beyond that taught explicitly and effectively, is related to successful leadership. We wish to reiterate, however, that the mere fact that an item of knowledge appears in doctrine does not mean, necessarily, that officers are supported in acquiring this knowledge or are able to put it into practice effectively.

Army leadership doctrine acknowledges the importance of experiential learning in the acquisition of leadership knowledge. We see similar trends in the civilian sector, where experience is regarded as an important feature of executive development (McCall, Lombardo, & Morrison, 1988). According to Army doctrine, leader development occurs through a combination of three complementary processes: institutional training, self-development, and operational assignments (experiential learning on the job). On-the-job experience provides opportunities for

officers to learn how to apply leadership knowledge codified in the doctrine and taught in the Army school system. On-the-job experiences also provide a context for acquiring new knowledge about leadership--knowledge for which acquisition is not well supported. When this knowledge is action oriented and instrumental to valued goals, we call it tacit knowledge.

Identifying Tacit Knowledge for Military Leadership

One goal of the literature search was to identify published, substantive tacit knowledge relevant to performance in military leadership roles at three organizational levels. Because the research literature on leadership was not a good source of substantive tacit knowledge, we turned to non-research publications on military leadership. This literature, which we shall refer to as the "practice" literature, consisted mainly of branch-specific trade journals, service college publications, and military memoirs. This literature, because it was written by and for practitioners, was a better source of substantive tacit knowledge (as we have defined it) than was the research literature. Thus, like Willie Sutton, who robbed banks because "that's where the money is," we focused on a subset of the published literature on leadership because that's where we thought the tacit knowledge was.

To reiterate, we focused on the practice literature because we found it to contain knowledge that met our above-stated definition of tacit knowledge. That is, the practice literature contained knowledge that was procedural in structure, of practical value, and usually acquired under conditions of low environmental support. This having been said, we must acknowledge that even the practice literature was a relatively poor source of substantive tacit knowledge when compared with face-to-face interviews, conducted as another part of this project. Nonetheless, our explorations in the practice literature were clearly valuable. As we hope to show in the remainder of this review, we obtained: (a) concrete examples of tacit knowledge for military leadership, (b) "tacit knowledge indicators," which will guide future knowledge-acquisition efforts, and (c) preliminary evidence regarding the structure of tacit knowledge for military leadership and its relation to organizational level.

Methodological Considerations

How did we know that knowledge in the practice literature was acquired under conditions of low environmental support for acquisition? For a particular individual, we can only judge the degree to which knowledge acquisition was supported by consulting his or her personal history. When we make this sort of judgment with respect to a class of individuals, we necessarily lose some precision. With this caveat, we suggest that, for the specified

class of Army officers, the knowledge that finds its way into trade journals, "lessons-learned" publications, and military memoirs is often acquired without much environmental support. First, if everything that a military officer needed to know was well supported by training programs, there would be no need for a practice literature. Second, the fact that an author-practitioner considered it useful to include a given piece of knowledge in an article or handbook suggests, on its face, that he or she thought this knowledge was worth stating or restating: People do not usually bother to tell us what they believe we already know.

One might object to this argument on the grounds that knowledge items in the practice literature are often included as part of classroom training in leadership. With regard to particular items of knowledge, this objection is undoubtedly valid. That is, we cannot be sure that some of the items we obtained from the practice literature are not well supported in some training venues. With respect to the set of items as a whole, however, this objection is less persuasive. Items from the practice literature do not, to our knowledge, form the core curriculum of Army leadership training in any venue. More realistically, selected articles from this literature may be included in course syllabi. Alternatively, trade journals for a given branch may be made available to officer-students in the basic or advanced courses for that branch. We believe that much of the knowledge contained in these publications is acquired under conditions of low environmental support. We think that such a working assumption is appropriate to a preliminary investigation of tacit-knowledge content in this domain.

We make a similar argument for the practical usefulness of knowledge obtained from the practice literature. Because author-practitioners attest to the usefulness of the knowledge they convey, we may assume that they have found it useful. That is, we may assume that they have found the knowledge they convey to be instrumentally relevant to the attainment of goals they personally value. Whether or not they are correct in this regard (i.e., whether the knowledge they convey is actually relevant to effective leadership, objectively specified) is a question that we address in a later section.

Selection of Items

What were our criteria for classifying an item of knowledge as tacit knowledge for military leadership? It is helpful to break this question down into three subquestions. First, how did we decide if an item of knowledge was tacit? Second, how did we decide if an item of knowledge pertained to military leadership? Finally, how did we decide that an item of knowledge was related to positive (rather than negative or neutral) leadership outcomes? We address each of these questions in turn. Each of

the selection criteria described in this section is presented, in
the form of contrasting examples, in Table 1.

Table 1
Instances and Non-Instances of Tacit Knowledge for Military
Leadership.

Criterion	Instance	Non-Instance
Procedural	"Get beyond 'careerism' by learning to be straight with yourself."	"Selfless service is one of the four elements of the professional Army ethic."
Practically Useful	"Evaluate training by phase and not by time."	"When on TDY, stay in good hotels to ensure plenty of fresh towels."
Low Environmental Support for Acquisition	"Look for opportunities to remain silent."	"Be an effective communicator."
Influence Others to Attain Goals (Leadership)	"When you refer a soldier to another source for help, make the call yourself."	"Look for grease marks on maintenance papers as indicators of proper PMC being performed."

We decided whether an item of knowledge was tacit or not by
evaluating it, qualitatively, in terms of its structure, its
conditions of use, and its conditions of acquisition. To the
extent that an item was procedural in structure, instrumental to
the attainment of valued (in this case, leadership) goals, and
acquired under conditions of low environmental support, we
classified it as an instance of tacit knowledge. Recall that
membership in the tacit-knowledge category, as in all natural
categories, is judged by resemblance and not by possession of
singly-necessary and jointly-sufficient features. Further,
degree of resemblance was judged with reference to a class of
individuals, and these judgments were necessarily approximate.
Notwithstanding, we believe that the items we selected possess
high face validity with respect to the tacit-knowledge concept.

What does the criterion of practical usefulness mean within
the context of military leadership? We have said that

practically-useful knowledge is instrumental to the attainment of personally-valued goals. The theory of tacit knowledge is silent, however, on whether these goals are good or evil, meaningful or trivial, selfish or selfless. By contrast, our delimitation of tacit knowledge <u>for military leadership</u> is not silent on this question. An item of knowledge that is practically useful for military leadership is, as we define it, one that is instrumental to the attainment of personally-valued goals that involve influencing others to attain goals for the good, effectiveness, or success of the organization.

Thus, our criterion for classifying an item as tacit knowledge for military leadership distinguishes between exclusively selfish or "careerist" goals and leadership goals that serve the best interests of the organization. We see this distinction as mirroring two common cases. In one case, the goals that an individual values are also those of the organization as a whole. When this is the case, tacit knowledge and tacit knowledge for leadership are coextensive. In the other case, however, an individual values goals that diverge from those that serve the good of the organization. At this point, tacit knowledge for leadership diverges from tacit knowledge in the general case. That is, the individual acquires and uses knowledge that is instrumental to the attainment of goals other than influencing others for the good of the organization. We classify as tacit knowledge for military leadership only that knowledge that corresponds, at least potentially, to the former case.

Finally, we decided if an item of knowledge was related to <u>effective</u> military leadership by evaluating, informally, the qualifications of the author-practitioner who published it. That is, we excluded from consideration knowledge offered by authors without reasonable claim to leadership experience. This method of determining the effectiveness of knowledge is clearly not a rigorous one. Recall, however, that it was not an objective of this review to criterion validate obtained knowledge items in relation to leadership performance. Such validation is planned for later empirical work, now in progress.

Tacit Knowledge Indicators

As stated above, we classify as tacit knowledge for military leadership only those items acquired under conditions of low environmental support for acquisition. But we also include in this review a number of items that fail to satisfy this test. These knowledge items, which we shall refer to as "tacit knowledge indicators," are procedural in structure, practically useful for leadership as we have defined it, but strongly

supported in doctrine or culture, and therefore not classifiable as tacit knowledge, strictly speaking.

We include these tacit-knowledge indicators in our review because we believe they indicate or signal areas of leadership knowledge that may have tacit content. We reason as follows: Knowledge that is supported in doctrine and also emphasized in the practice literature may be reiterated in the latter forum because it is difficult to put into practice. At the very least, its reemphasis in the practice literature suggests that there is variability, among the population of leaders, in the success with which this knowledge is put into practice. Where such variability is inferred, we may speculate that additional, tacit knowledge may be required to put the doctrinal knowledge into practice. Indeed, our experience in the interview phase of this project suggests that tacit knowledge often functions to guide the application of doctrinal knowledge.

Because one goal of this review was to obtain preliminary evidence regarding the content and structure of tacit knowledge for military leadership, we have included both tacit-knowledge items and tacit-knowledge indicators obtained from the practice literature. Both types of knowledge should inform later, more conclusive, knowledge-acquisition efforts.

Tacit-knowledge items (and tacit-knowledge indicators) were extracted from the military practice literature by the first author according to the criteria enumerated above. Because these items and indicators were the product of inferences drawn from statements or stories in one or more chapters or articles, individual citations are not provided. Instead, a list of references for all of the sources from which items or indicators were drawn is provided in the Appendix.

The set of items and indicators extracted by the first author was then reviewed by the other authors. The authors identified items that failed to meet the criteria for tacit knowledge--either reclassifying these items as indicators or removing them altogether. The authors also reworded tacit knowledge items and indicators in order to clarify their meaning. The process of reviewing and modifying tacit-knowledge items and indicators went through several iterations.

The Structure of Tacit Knowledge for Military Leadership

Once we had selected a set of tacit-knowledge items (and indicators), we sorted them into categories and subcategories. The initial sorting of items was performed by the project members at Yale University. They presented their results to the project members at the United States Military Academy who performed their own sort. The two senior authors then combined the two sortings of items and formed a final category structure that included

categories and subcategories formed in each of the first two sortings. The final category structure was influenced by the structure developed by Williams and Sternberg.

Since successful civilian managers undoubtedly use both leadership and management processes to fulfill their role functions, it seemed logical that Williams and Sternberg's framework should serve as a starting point in our study of the structure of tacit knowledge associated with successful leadership. Furthermore, the categories and subcategories of this framework seem to pertain directly to the military's definition of leadership. For example, the military defines leadership as an interpersonal influence process and Williams and Sternberg's framework has a major category labeled "interpersonal tacit knowledge" with subcategories including "influencing and controlling others" and "supporting and cooperating with others." Consequently, we felt that the categories outlined in this framework would serve as an initial guide in our search for tacit knowledge about military leadership. However, throughout the sorting process, we remained open to the emergence of new categories of tacit knowledge that represented the unique features of the military culture and context.

The sorting of items (and indicators) resulted in the category structure shown in Table 2. This structure represents a preliminary model of the structure of tacit knowledge for military leadership. According to this model, tacit-knowledge items may be distinguished from one another in terms of their relevance to dealing with the self, dealing with others, or dealing with organizational systems. These distinctions correspond to the intrapersonal, interpersonal, and organizational levels, respectively, and they form the highest-level categories in the tacit-knowledge structure we developed. For example, tacit knowledge about how to motivate oneself would be classified as intrapersonal. Knowledge about how to motivate one's subordinates would be classified as interpersonal. Knowledge about how to eliminate structural impediments to employee motivation would be classified as organizational. Thus, at the most abstract level, tacit-knowledge items are classified according to the level or sphere of experience in which they are employed.

Table 2
The Structure of Tacit Knowledge for Military Leadership

INTRAPERSONAL TACIT KNOWLEDGE
   Managing the Self
   Seeking Challenges and Control

INTERPERSONAL TACIT KNOWLEDGE
   Influencing and Controlling Others (Self --> Others)
   Supporting and Cooperating With Others (Self <--> Others)
   Learning from Others (Self <-- Others)

ORGANIZATIONAL TACIT KNOWLEDGE
   Solving Organizational Problems

Within the high-level categories, tacit-knowledge items differ from one another in terms of the goals they most directly serve. For example, some interpersonal tacit knowledge is directed toward influencing others, some toward supporting and cooperating with others, and some toward learning from others. Thus, at the subcategory level, tacit-knowledge items are classified according to the proximal goal or objective they help the leader to achieve. The qualifying adjective "proximal" is used here to denote a goal that is psychologically active or focal. For example, the tacit-knowledge indicator "don't discourage your subordinates from bringing you bad news" is classified as knowledge directed at learning from others, because it appears most directly to serve the goal of learning from others. This classification holds even though the piece of knowledge may also serve the goal of solving an organizational problem (e.g., eliminating information bottlenecks) or supporting and cooperating with others (e.g., giving the messenger a break instead of "shooting" him or her). As this example suggests, category assignments were often a matter of emphasis, and some tacit-knowledge items could be assigned to more than one category.

In the remainder of this section, we briefly describe the type of tacit knowledge that makes up each subcategory. The full set of tacit-knowledge items and tacit-knowledge indicators that we obtained from the practice literature is presented in a later section.

Intrapersonal Tacit Knowledge

The tacit-knowledge items we classify as intrapersonal are those employed in dealing with oneself. In our sample of tacit knowledge for military leaders, we found that this category of tacit knowledge was best described in terms of two subcategories:

(1) tacit knowledge about managing the self, and (2) tacit knowledge about seeking challenges and control.

Tacit knowledge about managing the self includes knowledge about how to organize oneself, manage time, and set priorities. It includes knowledge about how to motivate oneself and how to establish beneficial habits. Tacit knowledge about seeking challenges and control includes knowledge about taking initiative, taking responsibility, and acting to increase one's discretion. It includes knowledge about seeking challenges, taking appropriate risks, and questioning the status quo.

Interpersonal Tacit Knowledge

The tacit-knowledge items that we classify as interpersonal are those employed when dealing with others as individuals. We contrast interpersonal tacit knowledge with organizational tacit knowledge, discussed below, which is employed in dealing with others as parts of an organizational system. The distinction here is analogous to that made, in the physical sciences, between light energy described in terms of waves and light energy described in terms of particles or photons. In our usage, interpersonal tacit knowledge is the particle theory of dealing with others.

In our sample of tacit knowledge for military leaders, we found that interpersonal tacit knowledge was best described in terms of three subcategories: (1) tacit knowledge about influencing others, (2) tacit knowledge about supporting and cooperating with others, and (3) tacit knowledge about learning from others.

Tacit knowledge about influencing others includes motivating and inspiring others. It also includes disciplining, directing, and developing others. Tacit knowledge about supporting and cooperating with others includes knowledge of how to "take care of soldiers," how to get along with peers, and how to handle one's superiors. Tacit knowledge about learning from others includes knowledge about how to keep an open mind. It includes knowledge about how to keep oneself open to influence from others and how to learn from others.

Organizational Tacit Knowledge

The tacit-knowledge items that we classify as organizational are those employed in dealing with human organizations as systems. Returning to our analogy with theories of light energy, organizational tacit knowledge is the wave theory of dealing with others. In our sample of tacit knowledge for military leaders, we found that organizational tacit knowledge was best described as knowledge about solving organizational problems. Tacit knowledge about solving organizational problems includes

33

knowledge about diagnosing and "debugging" organizations and their cultures.

In summary, our preliminary structure of tacit knowledge for military leadership is organized according to intrapersonal, interpersonal, and organizational levels of experience, and according to a number of proximal goals within each of these levels. We do not wish to suggest, however, that this structure represents the final or conclusive partitioning of tacit knowledge for military leadership. In the next three sections, we enumerate and explain the tacit-knowledge items and indicators in each category, identify what appear to us to be prominent themes or foci, and draw comparisons with other sources of evidence concerning the content of leadership. We conclude each section with a discussion of how the tacit knowledge in a given category might differ in meaning and relevance across the three organizational levels of interest. Note that tacit-knowledge indicators are marked with an asterisk, and appear at the end of the description for each subcategory, in order to distinguish them from tacit-knowledge items.

Intrapersonal Tacit Knowledge

The category of tacit knowledge we have labeled intrapersonal includes knowledge that is used in interaction with the self. Table 3 shows the tacit-knowledge items and indicators in this category. As described above, our sort distinguished two subcategories of intrapersonal tacit knowledge: knowledge about managing the self, and knowledge about seeking challenges and control. We treat each subcategory in turn.

Table 3
Intrapersonal Tacit Knowledge for Military Leadership

MANAGING THE SELF
Be prepared to disobey an order in extraordinary circumstances.
Focus on what is important rather than urgent.
Don't spend most of your time on your worst soldiers.
Get beyond "careerism" by learning to be straight with yourself.
Look for opportunities to remain silent.

SEEKING CHALLENGES AND CONTROL
Treat role ambiguity as an opportunity to increase your
*   responsibility.*

Managing the Self

Tacit-knowledge items relevant to managing the self include the following:

*Be prepared to disobey an order in extraordinary
circumstances.*

When the need to disobey an order is both clear and critical, a
leader should be prepared to do so. The decision to disobey
should increase rather than decrease personal and professional
risk to oneself, and a principle of "minimal divergence" should
be followed. According to the principle of minimal divergence,
one seeks to diverge as little as possible from the commander's
intent--even when an order must be disobeyed.

Focus on what is important rather than urgent.

A leader who loses sight of his priorities may spend all his time
putting out "fires" and neglect progress toward his most
important goals. Effective leaders make decisions about what is
important and what is not and they allocate their time
accordingly. Sometimes this means that deadlines for low-
priority tasks are missed, or that extra responsibility is
delegated to subordinates. For example, a company commander who
places a high priority on taking care of soldiers will see to it
that pay inquiries are handled promptly so that soldiers can
receive payment due to them. The commander will not be diverted
from this task by the many minor crises that seem to demand
attention during the workday (e.g., a soldier temporarily
unaccounted for).

Don't spend most of your time on your worst soldiers.

Make sure that the least-deserving soldiers don't get the lion's
share of your time and attention. Although problems in a unit
must be remediated, there is a point at which bad soldiers use
more of your time than they are worth. Some soldiers thrive on
negative attention. These individuals represent bad investments
of your time and should be barred from reenlistment or separated
from the service. For example, a soldier who is repeatedly
absent without leave may engage his commander in long
explanations about his troubled family life before he came into
the service. Eventually, however, the commander must balance
time spent with this soldier against the need to attend to more
deserving soldiers.

*Get beyond "careerism" by learning to be straight with
yourself.*

At some point every leader must ask himself "do I really give a
damn about something more than myself?" Everyone wants to enjoy
career success but true leadership requires a willingness to
transcend career concerns for the greater good of the
organization. Indeed, military leadership may require a
willingness to sacrifice one's life for this greater good. One
way to develop and sustain your capacity for selfless action is

35

to listen to the ways in which you talk to yourself. By identifying self-centered and self-aggrandizing thoughts you can learn to redirect them. This sort of self-monitoring has the effect of building character. For example, upon self-examination, an officer may find that he tends to automatically interpret events in terms of their impact on his chances for promotion. This unconscious filtering process may cause him to overreact to some events (those he deems career relevant) and to underreact to others (those he deems career irrelevant). By noticing this tendency in himself, the officer can focus on interpreting events in terms of their importance to his unit's mission.

Look for opportunities to remain silent.

We often look for opportunities to speak when speaking is not warranted. We may speak in order to feel like we are contributing, or to show how much we know or how well we comprehend another speaker. By looking for opportunities <u>not</u> to speak, a leader can become sensitive to his or her weaknesses as a listener, and can help subordinates to develop confidence and a feeling of being listened to. For example, it is often best to withhold questions that arise as a subordinate is speaking until he is finished speaking. He may answer the question you are about to ask, in which case the interruption will have been unnecessary.

<u>Seeking Challenges and Control</u>

The tacit knowledge items relevant to seeking challenges and control include the following:

Treat role ambiguity as an opportunity to increase your responsibility.

Organizational roles are often ill defined. Formal job descriptions cannot enumerate all one's responsibilities, so these responsibilities must often be inferred. By actively looking for areas of role ambiguity, an individual in a leadership role can often assume unclaimed and unnoticed responsibility and thus increase his or her level of discretion in pursuing organizational goals. An individual without this knowledge may remain satisfied with the assumption that someone else is "handling it" and, in so doing, miss an opportunity to exercise leadership and expand influence. For example, although the administration of drunk-driving education programs is officially the responsibility of the commander, many first sergeants have taken this function over and have, in fact, convinced their commanders that drunk-driving education is "NCO business."

36

Discussion

We should begin by saying that the tacit-knowledge examples in this section are clearly incomplete when compared with what effective leaders actually know about dealing with themselves. Nonetheless, we can identify some themes that seem to be in accord with common conceptions of what makes a good leader. Leaders are considered to be persons of high character and personal effectiveness. The tacit knowledge in this category on how to set priorities, develop one's character, and take responsibility seems to be consistent with common conceptions of leadership.

How does this intrapersonal knowledge relate to Army leadership doctrine? The doctrinal mandate to "know yourself" focuses on self-knowledge of strengths, weaknesses, and personality. It encourages military leaders to take a self-inventory in order to identify who they are, who they think they are, and who others think they are. By contrast, the intrapersonal tacit knowledge we obtained focuses less on knowledge of self than on knowledge of strategies for handling the self. Such strategies are not well represented in the doctrinal specification of what leaders must know. Thus, in general, the knowledge that author-practitioners share with others about how to develop character and set priorities seems to fill a gap in Army doctrine.

When we compare the intrapersonal tacit knowledge in the military practice literature with that obtained in Williams and Sternberg's study, one difference is particularly salient. Although the latter study found a considerable amount of tacit knowledge related to recognizing and dealing with personal weaknesses, we found no such tacit knowledge in our review. This notable absence may reflect a cultural prohibition, within the military, against discussing personal weakness. Alternatively, it may reflect a prohibition against discussing personal weakness in military trade journals. Finally, Williams and Sternberg obtained tacit knowledge through literature search, interviews, and behavioral observations. Our tacit-knowledge structure rests, at present, on only the first of these sources of evidence. Tacit knowledge about dealing with personal weaknesses may emerge in later phases of the knowledge-acquisition effort.

Finally, we found little basis for distinguishing intrapersonal tacit knowledge in the practice literature according to organizational level. That is, although span of control, degree of complexity, and range of discretion increase with each successive level, the strategies for handling the self that we found in the practice literature appear to apply across levels.

37

Interpersonal Tacit Knowledge

The category of knowledge we have labeled interpersonal includes knowledge that is used in interacting with others as individuals. Table 4 shows the tacit-knowledge items and indicators in this category. As described above, our sort of these items distinguished three subcategories of interpersonal tacit knowledge: knowledge about influencing others, knowledge about understanding and cooperating with others, and knowledge about learning from others. We treat each of these kinds of knowledge in turn.

Table 4
Interpersonal Tacit Knowledge for Military Leadership

INFLUENCING AND CONTROLLING OTHERS (Self --> Others)

Use the minimum of technical jargon necessary to get your point across.
Listen carefully to soldiers--this teaches them to speak more carefully.
Fight rumor mongering with information.
Use team punishment to influence recalcitrant team members.
Don't think out loud in front of soldiers.
Be creative in recognizing good performance.
Ask your predecessor what the boss expects within the first 90 days.
*Don't use "hype" to fight soldier complacency.
*Train to standards and not to fill time.
*Communicate orders from above as your own.

SUPPORTING AND COOPERATING WITH OTHERS (Self <--> Others)

Use your old "war stories" sparingly when counseling soldiers.
Buffer your unit from "nice ifs."
Give the battalion chaplain a prominent role.
Don't trade your NCO's professional development for short-term gain.
When you refer a soldier to another source for help, make the call yourself.
Avoid the "senior officer shuffle."
*Make safety during training a top priority.
*When possible, work your soldiers from eight to five.

LEARNING FROM OTHERS (Self <-- Others)

Don't be afraid to learn from, or along with, your subordinates.
Get opinions from your junior leaders in writing.
*Don't discourage your subordinates from bringing you bad news.

Influencing Others

Tacit-knowledge items relevant to influencing others include the following:

Use the minimum of technical jargon necessary to get your point across.

Jargon can serve as a convenient shorthand among individuals who share a body of knowledge. Jargon can also give the user a feeling of power and belonging. It may even be used to baffle and intimidate individuals to whom it is unfamiliar. Leaders need to be effective communicators and jargon, technical or otherwise, can interfere with clear communication. For example, a signal officer does not need to lapse into "techspeak" when communicating with combat-arms personnel. Most communication problems can be described as maintenance, coordination, supervision, or technical in nature and these terms are detailed enough for most nonspecialists.

Listen to soldiers carefully--this teaches them to speak more carefully.

One of the most important things you can do to develop soldiers is to help them improve communication skills. One way to teach them how to communicate is to listen to them fully and carefully. Listening to soldiers fully means giving them your undivided attention when they are speaking, and asking whatever questions are necessary to be sure you understand. When soldiers know that what they say is carefully considered, they make more of an effort to communicate clearly and accurately. For example, a soldier who reports that he saw a missing weapon "sitting on a cot" needs to be queried further. When did he see this? Does he know whose cot it was? Did anyone else see the weapon? Was anyone else around when he saw the weapon? This soldier will likely learn to anticipate questions like these and will be better prepared to communicate clearly in the future.

Fight rumor-mongering with information.

If you keep soldiers in the dark, the orders you issue will seem obscure and arbitrary. Keeping soldiers in the dark encourages rumor-mongering about the mission, and this rumor-mongering can harm morale and decrease readiness. Don't take a vote on what your unit will do, but explain the situation to your soldiers, explain what you expect them to do, and tell them why it is important. Be prepared to respond to questions and even objections but make it clear that the mission is non-negotiable. For example, a battery commander might use a grease pencil on the windshield of his vehicle to show how a change in the gun positions will produce more effective support for an advance force. With the repositioning explained, soldiers will be less

likely to tell one another that the commander is just trying to keep them busy.

Use team punishment to influence recalcitrant team members.

Use team punishments only in situations where members of the team can clearly identify those who have been slacking off, dishonest, etc. In these situations, team punishment will encourage the team to exert pressure on the recalcitrant team members. This is the main purpose of team punishment. For example, a company commander might restrict his soldiers to the company area until those responsible for costly damage to the unit's pool table are identified. This sort of team punishment creates a climate in which vandals become very unpopular with their fellow soldiers, and in which soldiers learn to police one another while off duty.

Don't think out loud in front of soldiers.

By thinking out loud, you reveal the groping and confusion that often accompanies the early stages of problem solution, and revealing this can diminish soldiers' confidence. Don't pretend to be infallible but, in general, try to know what you are going to say before you open your mouth to say it. For example, although a great deal of uncertainty may have accompanied a decision, it should be communicated to soldiers in the form "O.K., here's what we're going to do..."

Be creative in recognizing good performance.

Look for opportunities to recognize soldiers who have performed well. For example, write letters of congratulations, give "impact" awards, grant time off, and use the Hometown News Release service. Look for ways to speed up paperwork (e.g., prepare "boilerplate" commendations for upcoming operations) so that soldiers receive commendations promptly and in the context/unit in which those commendations were earned.

Ask your predecessor what the boss expects within the first 90 days.

Your first 90 days are crucial to your relationship with your commanding officer. Although your commanding officer will tell you what he or she expects from you, you should also ask the officer who preceded you in the job. The two often have very different perspectives. For example, you may learn from your predecessor that the boss will require your attendance at frequent, long meetings where little seems to get accomplished. Knowing what your boss will require will enable you to budget time for these meetings.

*Don't use "hype" to fight soldier complacency.

Avoid overstating the seriousness or danger of situations in an effort to keep soldiers "pumped up." Soldiers will come to realize that the level of threat was exaggerated and you will have lost credibility. Instead of indulging in hype, look for other ways to increase alertness and intensity in soldiers. The military encourages its leaders to be candid with soldiers at all times. Thus, this piece of knowledge does not meet our criteria for tacitness. We regard this knowledge as a possible indicator of the existence of tacit knowledge about how to keep soldiers alert while they are performing mundane duties, or when they are under conditions of protracted, low-level threat.

Train to standards and not to fill time.

If you train to fill time, soldiers will learn to expand training tasks to fill the time available. In order to induce soldiers to make effective use of training time and resources, a leader must specify concrete goals for each exercise and make sure that soldiers understand these goals. If the goals of the exercise are reached before the scheduled completion time, soldiers should be given time off as a reward. This piece of knowledge does not meet our criteria for tacitness because environmental support for it is high. However, we regard it as an indicator of the existence of tacit knowledge about putting training doctrine into actual practice. For example, how does the leader determine that a unit has had enough training, even if it has not met standards? Under what conditions does a leader decide to stop training either before the allocated time is expired or before a set standard is reached? We believe that the tacit knowledge indicated by this item may relate to motivating soldiers.

Communicate orders from above as your own.

Although they may disagree strongly with orders from their superiors, leaders must not seek to distance themselves from or disclaim those orders when they transmit them down the chain of command. Orders from above must be communicated as one's own. Otherwise, subordinates may think that the task in question need not be done to standard. This piece of knowledge is high in environmental support, and therefore not tacit; yet the fact that it is reiterated in the practice literature may suggest that it is violated frequently. If our assumption is correct, this piece of knowledge may serve as an indicator of tacit knowledge about when a leader should not communicate orders from above as his or her own.

Supporting and Cooperating With Others

Tacit-knowledge items relevant to understanding and cooperating with others include the following:

41

Use your old "war stories" sparingly when counseling soldiers.

Although they may seem relevant, your own "war stories" are usually not that helpful to soldiers. Soldiers may fail to see the parallels to their own situation and may infer that you just want to talk about yourself. Focus on the soldier and what he or she wants to talk about.

Buffer your unit from "nice ifs."

A "nice if" is a task that it would be nice but not essential to do. Although many of these tasks are non-negotiable, some may be challenged and deflected. Buffering your soldiers is one of the most important ways you can take care of them. For example, when VIPs visit your post, you may be asked to put together a demonstration of your unit's war-fighting capability. When these assignments are frequent, unfairly distributed among units, or interfere with other missions, you should be prepared to object to your boss.

Give the battalion chaplain a prominent role.

Use the chaplain to build unit cohesion, to stay in touch with family concerns, and to counsel soldiers in trouble. Make sure that the chaplain does not spend most of his time in battalion headquarters but, rather, out with the troops. For example, ask the chaplain to debrief soldiers who have been subjected to Article 15 (non-judicial) disciplinary action.

Don't trade your NCO's professional development for short-term gain.

Good NCOs are crucial to the effectiveness of a unit and can quickly make themselves indispensable to a commander. The personal inconvenience of losing a good NCO who is sent for schooling may cause a commander to delay or defer such opportunities. Because delay or deferment is unfair to the NCO, because it creates a disincentive for NCOs to pursue excellence, and because it represents a failure of the commander to attend to the professional development of his subordinates, good leaders know that they should avoid this temptation.

When you refer a soldier to another source for help, make the call yourself.

When you counsel a soldier and decide, for whatever reason, that the soldier should see someone else for further help, make the appointment then and there. This small detail can make the difference between the soldier feeling "handed off" and feeling taken care of. For example, if you decide that a soldier needs to see a counselor at the mental health clinic, tell him that

you'd like to make an appointment for him. With his consent,
call the clinic, identify yourself, and ask for an appointment at
a date convenient to the soldier.

Avoid the "senior-officer shuffle."

Learn to move beyond the minimal standard for interacting with
soldiers. The "senior-officer shuffle" goes something like the
following:

1. "Hi son, where you from?"
2. "How's the chow?"
3. "You married?"
4. "Well, good talking to you."

Soldiers recognize this dialogue as *pro forma* and merely a
substitute for real interest and concern.

*Make safety during training a top priority.

In combat, a soldier's safety may be subordinated to mission
accomplishment, but safety should always come first in training.
If you subject your soldiers to avoidable risks in training, or
allow your junior officers to do so, the soldiers will feel
undervalued and an opportunity to gain their trust will have been
lost. Making soldier safety a priority in training has high
environmental support in the military. Thus, this piece of
knowledge is not tacit. However, it may serve as an indicator of
tacit knowledge concerning how a leader puts this priority into
practice.

*When possible, work your soldiers from eight to five.

Soldiers deserve as predictable a lifestyle as you can give them
without compromising mission objectives. Try not to keep them
late or bring them in early. Be especially careful about asking
soldiers to work late if you are yourself unmarried as you may
tend to underestimate the demands of family life. The
environmental support in the military for this piece of knowledge
has increased immensely in the last few years under the rubric of
soldier welfare. Therefore, it does not meet our criteria for
tacitness. However, this knowledge may serve to indicate the
existence of tacit knowledge about how a leader can take care of
soldiers and their families when the leader's unit conducts
extensive deployments.

Learning From Others

Tacit-knowledge items relevant to learning from others
include the following:

Don't be afraid to learn in front of, or along with,

your subordinates.

Officers at all levels need to be willing to learn with and from their junior officers or NCO's, particularly in technical areas where knowledge turnover is rapid. Leaders who are reluctant to learn from their subordinates, on the theory that subordinates should not see their superiors as deficient, are at risk for creeping technological illiteracy. Worse yet, they show themselves to be individuals who cannot admit their own imperfection. For example, when a communications company fields new equipment, the company commander cannot possibly learn all the components in the system as fast as specialists can learn their assigned components. Thus, the commander must rely on subordinates to teach him their pieces of the system.

Get opinions from your junior leaders in writing.

Ask your junior leaders to submit their opinions of the company, in writing, when you assume command. For example, ask them for their opinion of the three greatest strengths of the company and the three greatest weaknesses of the company, along with suggestions for remediating the weaknesses. Asking your junior leaders to submit opinions in writing gives you early information about the strengths and weaknesses in the company. Asking for opinions in writing also tells you who in your unit can think analytically and write clearly, and who needs remediation in these areas.

*Don't discourage your subordinates from bringing you bad news.

Make absolutely sure that your subordinates are not afraid to deliver bad news or you will gradually lose touch with your unit. Be sensitive to subtle ways in which your behavior may serve to punish the messenger. When taken at face value, this piece of knowledge fails to meet criteria for tacitness. However, it may indicate the existence of tacit knowledge about how one should and should not react to bad news.

Discussion

We found more items and indicators of interpersonal tacit knowledge than we did of intrapersonal tacit knowledge. This finding may reflect the relatively greater importance ascribed to these leadership functions among author-practitioners. Indeed, interpersonal influence is central to the U.S. Army's (and our own) definition of leadership.

Two broad themes may be discerned in the tacit knowledge we found in the practice literature. The first of these themes is motivating and informing followers. The second of these themes is the ubiquitous "taking care of soldiers." Both of these

44

themes are strongly supported (or at least much talked about) in Army culture. The tacit content appears to be the specific strategies for motivating, informing, and care taking.

When we compare interpersonal tacit knowledge in the military-practice literature with interpersonal tacit knowledge revealed in Williams and Sternberg's study of civilian managers, we note a potentially important difference. The difference is that, for civilian managers, the amount of tacit knowledge about influencing others was roughly equivalent to that about learning from others. In our review of the military practice literature, by contrast, much more tacit knowledge concerned influencing others than concerned learning from others. The difference between the two studies may simply be an artifact of our, as yet, incomplete identification of tacit knowledge. In particular, it may be a result of sampling bias inherent in our reliance on the practice literature. Alternatively, it may reflect a real difference between leadership roles and requirements in civilian and military settings. Because we are still in the preliminary stages of our own acquisition of tacit knowledge for military leadership, however, this speculation is not presented as a conclusion but, rather, as a possibility to be explored in interviews and behavioral observations.

How does the interpersonal knowledge we revealed relate to Army doctrine? Again, we focus on the doctrinal specification of what leaders must know. Interpersonal knowledge is covered most directly by the mandates to "know standards" and to "know human nature." Knowing standards entails knowing how to communicate standards to soldiers and how to motivate and direct them to meet those standards. Much of the tacit knowledge we obtained about influencing others consisted of concrete examples of the knowledge outlined in the mandate to "know standards." Indeed, much of the influencing that military leaders do is directed toward getting soldiers to meet standards.

How does this interpersonal knowledge relate to the three organizational levels under consideration? As was our experience with the intrapersonal tacit knowledge, we found very few examples of interpersonal tacit knowledge that were unique to a particular organizational level. Some specific techniques for influencing others, and for understanding and cooperating with others, appear to vary as a function of resources available to leaders at different levels. For example, battalion commanders have more discretion than do platoon leaders in allocating awards or in specifying the battalion chaplain's role. However, at a more general level, interpersonal tacit knowledge seems to generalize across levels. Again, it may be that the levels of interest in this study do not permit sufficient differentiation. According to both Army doctrine (Headquarters, Department of the Army, 1987) and stratified systems theory (Jacobs & Jaques, 1987), platoon through battalion levels are all classified as

45

direct-level leadership, which would suggest one reason for why we found few differences. Alternatively, as we note above, the literature review may not be telling the whole story. Again, interviews with leaders at each organizational level, along with experimentally-based data collection, should clarify the generalizability of interpersonal tacit knowledge across the three levels.

Organizational Tacit Knowledge

The category of tacit knowledge we have labeled as organizational includes knowledge that is used in interaction with others, when those others are viewed as elements of an organizational system. Table 5 shows the tacit-knowledge items and indicators in this category. The knowledge in this category may be characterized, generally, as knowledge about solving organizational problems.

Table 5
Organizational Tacit Knowledge for Military Leadership

SOLVING ORGANIZATIONAL PROBLEMS

Don't be afraid to modify non-judicial punishments given by your junior commanders.
Look closely at soldier-support services that are under-used.
Evaluate training by phase and not by time.
Don't always choose the best person or team for the job.
Don't take a soldier's Primary Military Occupational Specialty at face value.
Learn the history of your unit and share it with the soldiers.
*Relieve an officer of his command only as a last resort.
*Watch out for NCO "cross over points."
*Don't form battalion-level training teams.

Solving Organizational Problems

Tacit knowledge relevant to solving organizational problems includes the following:

> *Don't be afraid to modify non-judicial punishments given by your junior commanders.*

Article 15 punishments dictated by company commanders should be modified if they seem out of proportion to the offense—particularly if it is a first offense. Junior leaders who are closer to the situation may have difficulty making an impartial judgment about punishment. It is your job to provide that impartiality. As a battalion commander, you should be seen as a

fair arbiter and as an unbiased court of last resort to which soldiers may appeal.

> *Look closely at soldier support services that are under-used.*

Soldiers often fail to take advantage of support services that are available to them because these services are of low quality (e.g., mess and laundry facilities). Sometimes the persons who administer these services maintain low quality in order to discourage use of the services and thereby make their own jobs less demanding. These individuals diminish the quality of life for your soldiers and need to be held accountable.

> *Evaluate training by phase and not by time.*

When you evaluate troops in a training exercise, watch an entire phase of the operation before moving on to evaluate other squads. Watching each squad for half an hour makes it hard to give meaningful feedback on mission performance. For example, plan to observe the securing and setup of an assembly area from start to finish. Then move on to observe another phase of the field exercise.

> *Don't always choose the best person or team for the job.*

To remediate weaknesses in your unit, get in the habit of distributing tasks in a manner that meets development as well as efficiency goals. If you always pick the best persons for the job, they are the only ones who will get any experience at the job. For example, pair an able soldier with a less-able soldier and assign the job to them as a team. With any luck, the able soldier will tutor the less-able soldier. This experience can be a beneficial experience for both soldiers.

> *Don't take a soldier's PMOS at face value.*

Because soldiers often work outside of their Primary Military Occupational Specialty (PMOS) for extended periods of time, a company commander cannot assume that a soldier arriving from another unit will currently be proficient in her PMOS. Because many assignments outside of a soldier's PMOS are "off the books," a commander should question new arrivals about what they have actually been doing for the last few years.

> *Learn the history of your unit and share it with the soldiers.*

Teach your soldiers the history of their unit--how it trained and how it fought. Use photos if these can be obtained. History lessons like these enable soldiers to see their work in a larger

context. These lessons also remind your soldiers that others in their position have been called upon to fight. For example, the battalion commander of the 1st Battalion, 23rd Infantry, frequently talked to his officers and soldiers about the battle of Chi Pyong Ni and the courage displayed by the regiment in holding off five enemy divisions. Each year, the battalion marched over 100 miles to the battle site to commemorate the regiment's victory.

Watch out for NCO "cross over points."

Many NCOs have difficulty making the transition from technical expert to leader. These individuals represent potential trouble spots in the chain of command and problems can be prevented by giving them special attention when evaluating a unit under one's command. This piece of knowledge does not meet our criteria for tacitness but it may indicate the existence of tacit knowledge about how to help NCOs make a successful transition to positions of greater responsibility.

Don't form battalion-level training teams.

A battalion-level training team that travels among companies to train each company on a particular weapon system has the advantage of easy administration and expertise but, in the long run, will cause problems. Because no training infrastructure is developed at the company level, gains in proficiency will not survive personnel changes. Further, company commanders will come to think of training on this system as a battalion-level concern. This piece of knowledge is supported in Army training doctrine. However, it may indicate the existence of tacit knowledge about when to centralize and when to decentralize training tasks.

Relieve an officer of his command only as a last resort.

Removing an officer from a position of command disrupts his unit severely. It is often hard for you, as the superior officer, to predict the consequences of such a disruption for unit performance and morale. This piece of knowledge has high environmental support and, thus, does not qualify as an item of tacit knowledge. However, it may indicate the existence of tacit knowledge about when and how to relieve an officer of command.

Discussion

We have found a number of examples of tacit knowledge for solving organizational problems in the military-practice literature. The set of tacit-knowledge items and indicators concerned detecting, diagnosing, and remediating problems of training, staffing, and discipline. Thus, the knowledge we found

48

seems to be consistent with common-sense notions of a leader as one who sees the organization at the systems level--the "big picture."

How does this tacit knowledge relate to Army leadership doctrine? Army doctrine specifies that leaders must know their units. Knowing one's unit means knowing the strengths and weaknesses of a particular group, knowing how to build discipline at the unit level, and knowing how to build teams and unit cohesion. Much of the organizational tacit knowledge we collected seems to support these goals. For example, tacit knowledge about when to centralize or decentralize training helps leaders build unit cohesion and reflects knowledge of the unit. Similarly, a leader who knows how to use creative means to recognize good performance is able to sustain motivation and may be said to know his or her unit well.

Perhaps the most striking feature of the organizational tacit knowledge samples was the absence of knowledge concerned with envisioning the future. Williams and Sternberg obtained a number of items of this sort in their study of civilian managers. Further, many leadership theories place strategic vision at the center of the leader's role (Bass, 1985; Nanus, 1992). Our own pretheoretical ideas about leadership also place great importance on envisioning the future. Why then did we find no tacit knowledge about this apparently critical leadership function?

One possibility, of course, is that some of the publications on which we relied had, as a target audience, junior leaders. In this case, the absence of tacit knowledge about envisioning the future may reflect the relatively low levels of discretion and short time horizons that junior officers possess. But we consulted publications targeted at battalion commanders and still found no good examples of tacit knowledge for envisioning the future.

For this reason, we cannot rule out the possibility that strategic vision, as it is talked about by civilian leadership researchers and practitioners, is a nonfactor in Army leadership at or below the battalion level. Consistent with this speculation, interview data suggested that looking into the future (e.g., worrying about division-level, long-term planning) is not regarded as desirable conduct for a company commander.

Finally, tacit knowledge about solving organizational problems appears to be more differentiated with respect to organizational level than the other two categories of tacit knowledge. Although any conclusions based on such a limited sample must remain tentative, there is reason to believe that differences in unit size under one's command lead to differences in the applicability of particular knowledge about solving "systems level" problems. That is, because the size of the

49

system changes with increased rank, knowledge about debugging or optimizing the system may vary in corresponding fashion. Note that this change in level of analysis does not obviously occur in the cases of intrapersonal or interpersonal tacit knowledge.

General Discussion

We had three major goals in undertaking the present review. The first of these goals was to present the theory of tacit knowledge, along with theoretical and empirical support for the tacit-knowledge approach. We believe that we have presented the theory, and support for it, in enough detail to allow interested parties to understand and evaluate future applications of the theory. Our second goal was to describe the domain to be characterized in terms of tacit knowledge--military leadership. We believe that we have characterized this domain by providing a working definition of military leadership (based on U.S. Army doctrine) that is sensible as well as appropriate for the goals of this project. Our third goal was to identify substantive tacit knowledge for military leadership. Clearly, this goal was the most problematic, inasmuch as we expected, and found, that tacit knowledge for military leadership is not well represented in either the research or practice literature on military leadership. By contrast, we found officer interviews to be much better sources of substantive tacit knowledge.

Nonetheless, we feel that the tacit-knowledge items and indicators we obtained from the practice literature, although limited in number, are valuable in at least three respects. First, they allow us to instantiate the tacit-knowledge concept and make our review less abstract. They give the reader a good idea of what we will be looking for in later knowledge-acquisition efforts. Second, they provide a source of converging evidence (along with interviews and behavioral observations) about the content and structure of tacit knowledge for military leadership. Thus, they increase confidence in the generalizability of our conclusions. Finally, they provide preliminary information, in the form of focused questions that will guide future knowledge acquisition, concerning the structure and content of tacit knowledge for military leadership.

We began this review, and this project, with a set of very general questions about the relationship between tacit knowledge and military leadership. Although the literature search has not provided conclusive answers to these questions, it has provided us with a set of much more focused questions that were not apparent at the project's inception. These questions represent the current state of our thinking about tacit knowledge for military leadership and they are worth reiterating here.

First, why did we obtain so little tacit knowledge about envisioning the future? As we have said, many theories of

leadership place this strategic or visionary component at the core of leadership, and the Williams and Sternberg data led us to expect important tacit knowledge related to this function. Yet we found very little evidence that military leaders, at the platoon, company, and battalion levels, need to think about envisioning the future. This finding, or lack thereof, may suggest that vision is not an important part of the military leader's task, and thus of his or her knowledge, for the levels under consideration. Alternatively, it may suggest that our tacit knowledge category needs to be reformulated--perhaps into something like "concern for posterity." Indeed, early interviews suggest that Army officers with relatively short time horizons may exercise "vision" chiefly in their concern and planning for the well being of their unit after that unit has been turned over to another commander. Finally, of course, this finding may merely tell us about the Army practitioner literature and what sort of information finds its way into print.

A second set of questions concerns the relationship between the tacit knowledge we obtained and military doctrine. We found some indication that tacit knowledge for military leadership serves to fill gaps in Army leadership doctrine. This gap-filling function seemed particularly salient in tacit knowledge about managing the self, on which Army leadership doctrine is nearly silent. We also found indications that tacit knowledge guides the application of Army doctrine in practical situations (e.g., what does it mean to "take care of soldiers"?) Our findings, although preliminary, raise a number of questions about the true relationship between tacit knowledge and Army doctrine. Does tacit knowledge cover situations that Army doctrine fails to cover? If so, what are these situations? Does tacit knowledge guide the application of Army doctrine? If so, how does tacit knowledge "add value"? Does it simply make abstract doctrine more concrete? Does tacit knowledge encode boundary conditions or "contraindications" for the application of doctrine in real situations? All these questions, raised by the literature search, warrant further attention.

Finally, why did we observe so little variation in the applicability of tacit knowledge across organizational levels? The jobs of the platoon, company, and battalion commander are certainly different in myriad ways. Why did so few of the tacit-knowledge items we obtained reflect these differences? At least two possibilities need to be considered in future work. First, there may be level-specific tacit knowledge that our literature search failed to uncover. Indeed, the practitioner literature we relied on seems more directly targeted at company grade than at field-grade officers. Alternatively, the relative lack of level-specific knowledge in our sample may tell us something about how tacit knowledge manifests itself in this domain. It is possible that future work will identify level-general and level-specific categories of tacit knowledge. Indeed, we obtained evidence that

51

tacit knowledge for solving organizational problems varied strongly by level--just as the nature of the organizational problems faced at these levels varies. The issue of the degree to which tacit knowledge varies by organizational level will be elucidated in future work. This issue promises to tell us something valuable, both about tacit knowledge itself and about the different military roles under study.

As we proceed with our analysis of the interview data and empirical research, more light will be shed on the role of tacit knowledge in military leadership. We will evaluate the preliminary tacit-knowledge category structure presented here, and modify it as appropriate. We will investigate the value of the collected tacit-knowledge items as predictors of leadership success, amending these items as necessary. Throughout this effort, we will focus not only on finding the tacit knowledge associated with leadership success, but equally importantly, on organizing this knowledge into a teachable format. Through this research plan we will fulfill our objectives to identify, assess, and teach tacit knowledge for military leadership.

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Appendix A

Sources of Tacit-Knowledge Items and Indicators

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